

REMARKS

The Office Action dated August 23, 2005, has been received and carefully noted. The amendments made herein and the following remarks are submitted as a full and complete response thereto.

By this Amendment, claims 1-4 and 12-20 have been amended. No new matter is added.

Entry of this Amendment is proper under 37 C.F.R. § 1.116 since this Amendment: (a) places the application in condition for allowance for reasons discussed herein; (b) does not raise any new issue regarding further search and/or consideration since the Amendment amplifies issues previously discussed throughout prosecution; (c) does not present any additional claims without canceling a corresponding number of finally-rejected claims and (d) places the application in better form for appeal, should an appeal be necessary. The Amendment is necessary because it is made in reply to arguments raised in the rejection. Entry of the Amendment is thus respectfully requested.

Accordingly, claims 1-20 are currently pending in the present application and are respectfully submitted for consideration.

Allowable Subject Matter

Applicants appreciate the indication of allowable subject matter recited in claims 19 and 20.

Claim Objections

Claims 19 and 20 were objected to for having informalities. Claims 19 and 20 have been amended to obviate these objections. Accordingly, Applicants respectfully submit that claims 19 and 20 should be allowed.

Rejection of Claims 1-4 and 7-9

Claims 1-4 and 7-9 were rejected under 35 U.S.C. § 102(b) as being anticipated by Lakin (U.S. Patent No. 5,942,958). This rejection is respectfully traversed.

Claim 1 recites a filter element comprising, among other features, at least one of the series-arm resonators including the series-arm resonator at the first stage on the signal input side being composed of a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel, at least one of the parallel-arm resonators being composed of only one single-terminal pair piezoelectric thin-film resonator.

Claim 3 recites a filter element comprising, among other features, at least one of the parallel-arm resonators including the parallel-arm resonator at the first stage on the signal input side connected directly to an input terminal of the filter element is composed of a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel.

Claim 4 recites a filter element comprising, among other features, each of all the series-arm resonators including a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel.

It is respectfully submitted that the prior art fails to disclose or suggest at least the above-mentioned features of the Applicants' invention.

Lakin discloses a symmetrical piezoelectric resonator filter. For example, Lakin provides a resonator X31 connected to the input terminal 33 and located at the first stage consists of a single resonator. Furthermore, Lakin provides parallel resonator of the first stage consisting of the resonators X32A and X32B, which are NOT connected directly to the input terminal but are connected so as to follow the series resonator X31.

In contrast, claim 1 recites at least the features of “at least one of the series-arm resonators including the series-arm resonator at the first stage on the signal input side being composed of a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel”. Thus, in one example of the present invention, at least the series-arm resonator at the first stage on the signal input side is composed of a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel. Accordingly, Applicants submit that at least the structural elements as recited in claim 1 of the present application are different and distinguishable from Lakin.

Moreover claim 3 defines “at least one of the parallel-arm resonators including the parallel-arm resonator at the first stage on the signal input side connected directly to an input terminal of the filter element is composed of a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel,” and claim 4 recites at least the features of “each of all the series-arm resonators including a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel.” It is submitted that the structural elements for the filter are employed in the filters shown in Figs. 18 and 15, for example. For instance, the parallel-arm resonator connected to the input terminal is composed of a pair of resonators. Accordingly, Applicants submit that at least the

structural elements as recited in claims 3 and 4 of the present application are different and distinguishable from Lakin.

Therefore, it is submitted that the cited prior art fails to disclose or suggest each and every element recited in claims 1, 3 and 4 of the present application.

Moreover, to qualify as prior art under 35 U.S.C. §102, a single prior art reference must teach, i.e., identically describe, each feature of a rejected claim. As explained above, Lakin fails to disclose or suggest each and every feature of claims 1, 3 and 4. Accordingly, Applicants respectfully submit that claims 1, 3 and 4 are not anticipated by nor rendered obvious by the disclosure of Lakin. Therefore, Applicants respectfully submit that claims 1, 3 and 4 are allowable.

As claims 2, 7-9 depend from claim 1, Applicants submit that each of these claims incorporates the patentable aspects therein, and are therefore allowable for at least the reasons set forth above with respect to the independent claims, as well as for the additional subject matter recited therein.

Accordingly, Applicants respectfully request withdrawal of the rejection.

Rejection of Claims 1-4, 7, 8, 10 and 11

Claims 1-4, 7, 8, 10 and 11 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibata et al. (U.S. Patent No. 6,556,103, hereinafter "Shibata") in view of Tikka et al. (U.S. Patent No. 6,741,145, hereinafter "Tikka"). This rejection is respectfully traversed.

In making the rejection, the Examiner characterized Shibata and highlighted Figures 33, 35 and 37, as allegedly disclosing "a ladder filter formed with TFRs wherein

each of the series arm and parallel arm resonators 10 in Fig. 37 is replaced with two TFRs connected in parallel as shown in Figs. 22 and 35 (see col. 15, lines 3-5). Furthermore, the Examiner acknowledged that Shibata “does not explicitly show that all of the resonators in the ladder filter of Fig. 37 share the piezoelectric layer.”

Applicants submit that Shibata in view of Tikka fail to disclose or suggest each and every element recited in claims 1, 3 and 4 of the present application. In particular, it is submitted that the structural elements of Shibata in combination with Tikka are neither comparable nor analogous to the structural elements of present invention, for example, the features of “at least one of the parallel-arm resonators being composed of only one single-terminal pair piezoelectric thin-film resonator” as recited in claim 1. Therefore, Applicants submit that Shibata in view of Tikka fail to disclose each and every element recited in claims 1, 3 and 4 of the present application.

To establish *prima facie* obviousness, each feature of a rejected claim must be taught or suggested by the applied art of record. See M.P.E.P. §2143.03 and In re Royka, 490 F.2d 981 (CCPA 1974). As explained above, Shibata in view of Tikka, taken alone or in combination, do not teach or suggest each feature recited by claims 1, 3 and 4. Accordingly, for the above provided reasons, Applicants respectfully submit that claims 1, 3 and 4 are not rendered obvious under 35 U.S.C. § 103 by the teachings of Shibata in view of Tikka, and therefore are allowable.

As claims 2, 7-8 and 10-11 depend from claim 1, Applicants submit that each of these claims incorporates the patentable aspects therein, and are therefore allowable

for at least the reasons set forth above with respect to the independent claims, as well as for the additional subject matter recited therein.

Under U.S. patent practice, the PTO has the burden under §103 to establish a *prima facie* case of obviousness. In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Both the case law of the Federal Circuit and the PTO itself have made clear that where a modification must be made to the prior art to reject or invalidate a claim under §103, there must be a showing of proper motivation to do so. The mere fact that a prior art reference could arguably be modified to meet the claim is insufficient to establish obviousness. The PTO can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of the references. Id. In order to establish obviousness, there must be a suggestion or motivation in the reference to do so. See also In re Gordon, 221 USPQ 1125, 1127 (Fed. Cir. 1984) (prior art could not be turned upside down without motivation to do so); In re Rouffet, 149 F.3d 1350 (Fed. Cir. 1998); In re Dembiczak, 175 F.3d 994 (Fed. Cir. 1999); In re Lee, 277 F.3d 1338 (Fed. Cir. 2002). The Office Action restates the advantages of the present invention to justify the combination of references. There is, however, nothing in the applied references to evidence the desirability of these advantages in the disclosed structure.

Applicants respectfully request withdrawal of the rejection.

Rejection of Claim 10

Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lakin. This rejection is respectfully traversed.

As claim 10 depends from claim 1, Applicants submit that claim 10 incorporates the patentable aspects therein, and are therefore allowable for at least the reasons set forth above with respect to independent claim 1, as well as for the additional subject matter recited therein.

Applicants respectfully request withdrawal of the rejection.

Rejection of Claims 5 and 6

Claims 5 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lakin in view of Satoh et al. (U.S. Patent No. 5,631,612, hereinafter "Satoh"). In addition, claims 5 and 6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Shibata and Tikka as applied to claim 1 and further in view of Satoh. These rejections are respectfully traversed.

Lakin, Shibata and Tikka are discussed above with respect the rejection of claim 1.

Satoh is applied for allegedly disclosing the admittance Y of multiple parallel arms are made to be the same, wherein the impedance Z of the series arms is related to admittance such that the admittance of multiple parallel arms are also the same, such that when resonators are split or combined the total admittance of the parallel arm remains the same. Satoh is further applied for allegedly disclosing designing resonators in ladder filters to have such admittance relationships as discussed in the immediately

preceding rejection. However, it is submitted that Satoh fails to overcome the drawbacks of Lakin and Shibata in view of Tikka, as discussed above.

As claims 5 and 6 depend from claim 1, Applicants submit that claims 5 and 6 incorporate the patentable aspects therein, and are therefore allowable for at least the reasons set forth above with respect to independent claim 1, as well as for the additional subject matter recited therein.

Applicants respectfully request withdrawal of the rejections.

Rejection of Claim 11

Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lakin in view of Tikka (U.S. Patent No. 6,407,649, hereinafter "Tikka '649"). This rejection is respectfully traversed.

Lakin is discussed above, and Tikka fails to overcome the drawbacks of Lakin.

As claim 11 depends from claim 1, Applicants submit that claim 11 incorporates the patentable aspects therein, and is therefore allowable for at least the reasons set forth above with respect to independent claim 1, as well as for the additional subject matter recited therein.

Applicants respectfully request withdrawal of the rejections.

Rejection of Claims 12-18

Claims 12-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lakin in view of Bradley et al. (U.S. Patent No. 6,262,637, hereinafter "Bradley"). Furthermore, claims 12-18 were rejected under 35 U.S.C. § 103(a) as being

unpatentable over Shibata and Tikka as applied to claim 1 and further in view of Bradley. These rejection are respectfully traversed.

It is submitted that claims 12, 13, 15 and 17, as amended, recite among other features “at least one of the series-arm resonators including the series-arm resonator at the first stage on the signal input side being composed of a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel, at least one of the parallel-arm resonators being composed of only one single-terminal pair piezoelectric thin-film resonator.” Additionally, claims 14, 16 and 18 as amended, recite among other features, “at least one of the parallel-arm resonators including the parallel-arm resonator at the first stage on the signal input side connected directly to an input terminal of the filter element is composed of a plurality of single-terminal pair piezoelectric thin-film resonators connected in parallel.”

Lakin, Shibata and Tikka are discussed above with respect the similarly recited features.

Bradley is applied for allegedly disclosing “that it would have been extremely well known in the art to provide thin film piezoelectric resonator filters in packages as the transmitting and receiving filters in duplexers utilizing a power amplifier in the transmitting branch and a low noise amplifier in the receiving branch. Bradely is also applied for allegedly disclosing the packaging of TFR filters and their use in duplexers.

However, Applicants submit that the combination of Lakin in view of Bradely, and Shibata in view of Tikka and further in view of Bradley fail to disclose or suggest each

and every element recited in claims 12-18 of the present application, and therefore are allowable.

Applicants respectfully request withdrawal of the rejections.

Conclusion


In view of the above, Applicants respectfully submit that each of claims 1-20 recites subject matter that is neither disclosed nor suggested in the cited prior art. Applicants also submit that the subject matter is more than sufficient to render the claims non-obvious to a person of ordinary skill in the art, and therefore respectfully request that claims 1-20 be found allowable and that this application be passed to issue.

If for any reason, the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact the Applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper has not been timely filed, the Applicant respectfully petitions for an appropriate extension of time.

Any fees for such an extension, together with any additional fees that may be due with respect to this paper, may be charged to counsel's Deposit Account No. 01-2300, referring to client-matter number 025720-00017.

Respectfully submitted,



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